

FIG. 1

DIGITAL 12

NUMBER 8 (SIGNAL LEVEL) 4 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 SAMPLE NUMBER (INDEX)

**OBTAIN OR CREATE ORIGINAL** FIG. 2 DIGITAL SIGNAL OR IMAGE ESTIMATE ROUGH OFFSET AND RMS NOISE CHOOSE N OR N-BIT IDENTIFICATION WORD, E.G. 32 **GENERATE N-BIT IDENTIFICATION WORD** GENERATE OR SYNTHESIZE N "RANDOM" INDEPENDENT SIGNALS WITH ROUGHLY GAUSSIAN DISTRIBUTION ABOUT SOME MEAN VALUE, WHERE SIGNALS HAVE EQUAL EXTENT AND DIGITAL SPACING OF ORIGINAL DIGITAL SIGNAL OR IMAGE APPLY DIGITAL FILTER WHICH ATTENUATES BOTH LOW AND HIGH FREQUENCIES, LEAVING MIDDLE-RANGE FREQUENCIES LARGELY INTACT CONDENSE N RANDOM SIGNALS TO A LOWEST ACCEPTABLE BIT VALUE IF MEMORY OR STORAGE SPACE IS AT A PREMIUM ADD ALL RANDOM IMAGES TOGETHER WHICH HAVE A CORRESPONDING '1' IN THEIR ASSOCIATED BIT-PLACE-VALUE OF THE N-BIT IDENTIFICATION WORD, CALL THIS THE BASE COMPOSITE SIGNAL OR IMAGE EXPERIMENT VISUALLY WITH GAIN AND GAMMA APPLIED TO BASE COMPOSITE SIGNAL OR IMAGE, ADDING THIS TO ORIGINAL DIGITAL SIGNAL OR IMAGE, AND DETERMINING THE ACCEPTABLE PERCEIVED NOISE LEVEL APPLY FOUND GAIN AND GAMMA TO BASE COMPOSITE. ADD TO ORIGINAL, THEN CALL THIS THE DISTRIBUTABLE SIGNAL OR IMAGE STORE AWAY AND SECURE ORIGINAL SIGNAL OR IMAGE, ALONG WITH N-BIT IDENTIFICATION WORD AND THEN RANDOM SIGNALS SELL OR DISTRIBUTE THE DISTRIBUTABLE SIGNAL OR IMAGE

OBTAIN DIGITAL OR NON-DIGITAL COPY FIG. 3 OF SUSPECT SIGNAL OR IMAGE DIGITIZE IF NOT ALREADY DIGITAL CUT AND MASK PORTION OF SIGNAL OR IMAGE BELIEVED TO BE SUSPECT (ONLY IF ENTIRE SIGNAL OR IMAGE IS NOT SUSPECT) PROCURE ORIGINAL DIGITAL SIGNAL OR IMAGE AND CUT AND MASK TO ROUGHLY THE SAME LOCATION OR SEQUENCE VISUALLY RESCALE AND REGISTER THE CUT-OUT SUSPECT SIGNAL TO THE CUT-OUT ORIGINAL SIGNAL RUN THROUGH SEARCH PROGRAM WITH MEAN SQUARED ERROR AS CRITERIA AND X OFFSET, Y OFFSET, AND SCALE AS THE THREE VARIABLES APPLY X OFFSET, Y OFFSET, AND SCALE TO CUT-OUT SUSPECT, THEN RESAMPLE ONTO EXACT GRID AND CUT-OUT OF ORIGINAL SIGNAL RUN THROUGH SEARCH PROGRAM WITH MEAN SQUARED ERROR AS CRITERIA AND DC OFFSET, GAIN, AND GAMMA AS THE THREE VARIABLES; APPLY TO SUSPECT SUBTRACT ORIGINAL FROM SUSPECT, GIVING DIFFERENCE SIGNAL OR IMAGE STEP THROUGH ALL N RANDOM INDEPENDENT SIGNALS, MASKED AS ORIGINAL AND CROSS-CORRELATED WITH DIFFERENCE SIGNAL IN IMMEDIATE NEIGHBORHOOD OF REGISTRATION POINTS FIND 0 AND 1 LEVEL BY AVERAGING FIRST FOUR 0101 CODE VALUES ASSIGN EITHER A 0 OR A 1 TO EACH CROSS-CORRELATION RESULT DEPENDING ON PROXIMITY TO THE AVERAGES OF PREVIOUS STEP CHECK RESULT AGAINST SECURED IDENTIFICATION NUMBER PROSECUTE IF IT MATCHES? OR AT LEAST SEND A NASTY LETTER DEMANDING RECOMPENSE

FIG. 5

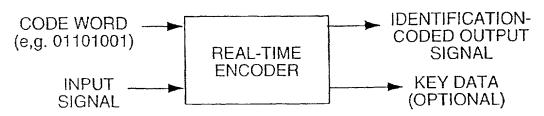
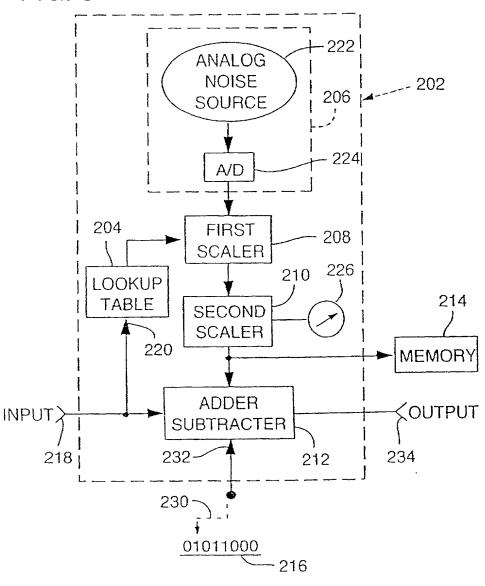
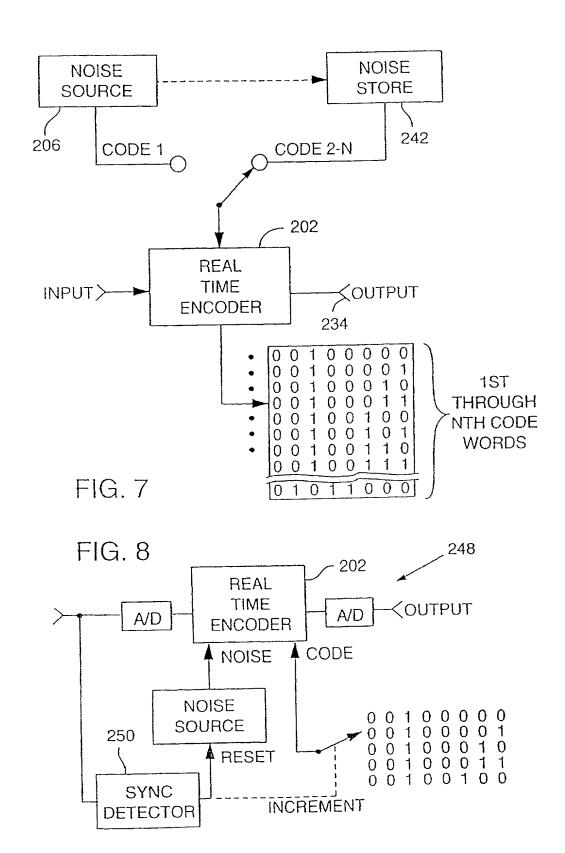
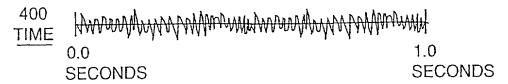


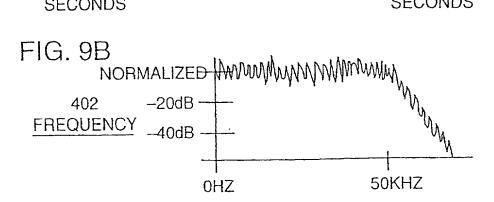
FIG. 6

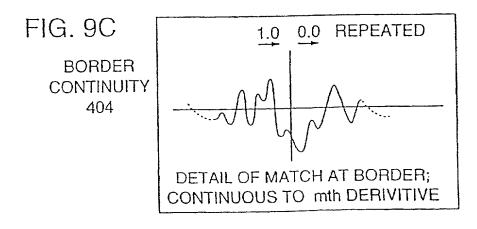


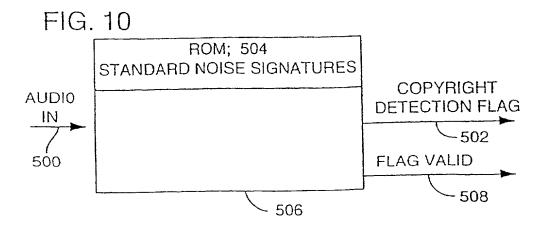












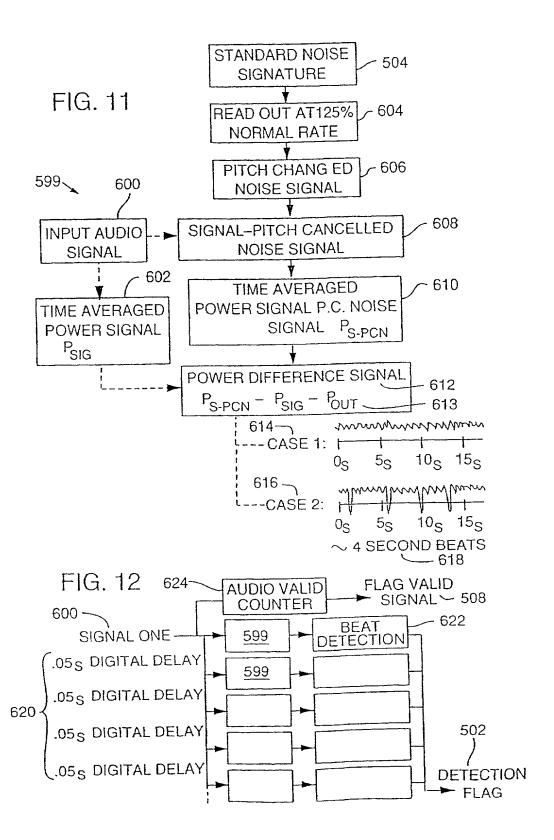
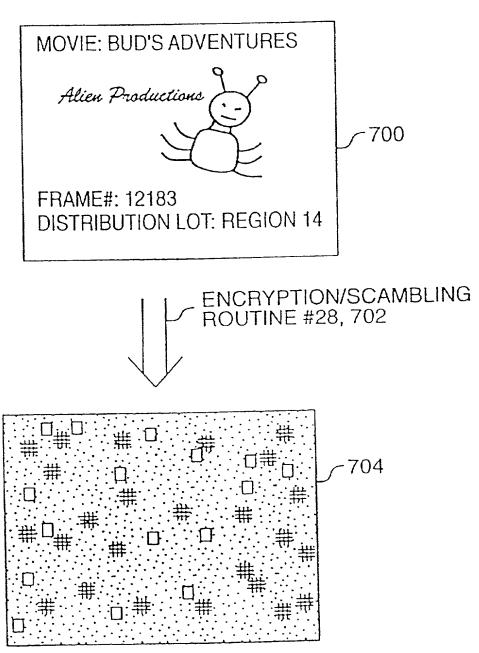
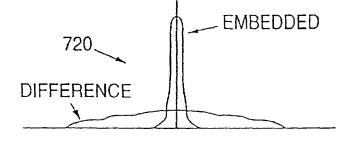


FIG. 13

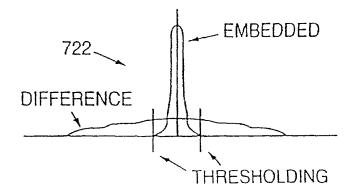


PSEUDO-RANDOM MASTER SNOWY IMAGE (SCALED DOWN AND ADDED TO FRAME 12183)

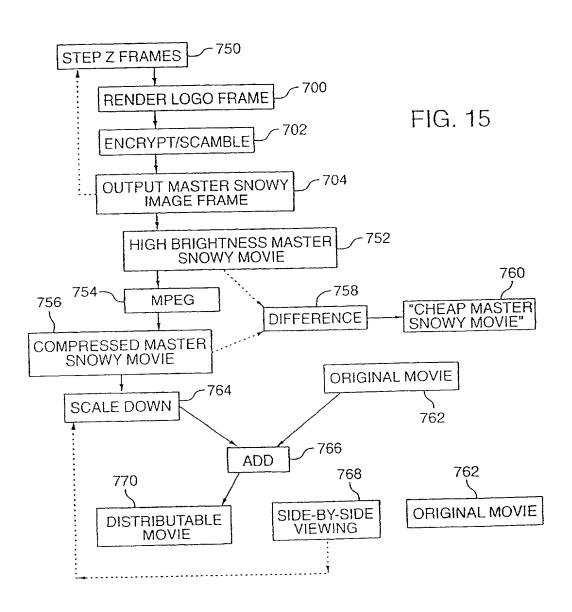
# FIG. 14



MEAN-REMOVED HISTOGRAMS OF DIFFERENCE SIGNAL AND KNOWN EMBEDDED CODE SIGNAL

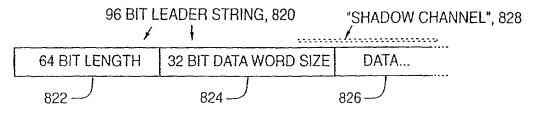


MEAN-REMOVED HISTOGRAMS OF FIRST DERIVATIVES (OR SCALER GRADIENTS IN CASE OF AN IMAGE)



		JOE'S IMAGE		JOE'S IMAGE	JOE'S IMAGE	m	JOE'S IMAGE
802	WW.	JOE'S IMAGE					
001101011101	DATA STREAM	JOE'S IMAGE					
800 JOE'S IMAGE	HEADER	JOE'S IMAGE		JOE'S IMAGE	JOE'S IMAGE		JOE'S IMAGE JOE'S IMAGE
FIG. 16	3	JOE'S IMAGE					/

FIG. 17



UNIVERSAL EMPIRICAL DATA FORMAT

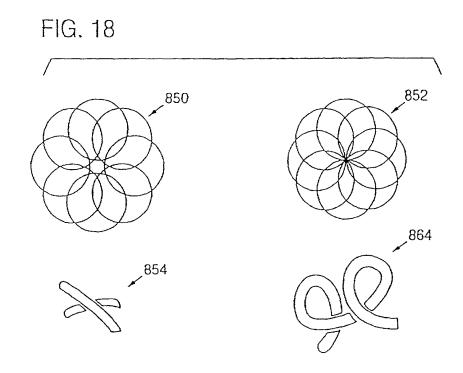
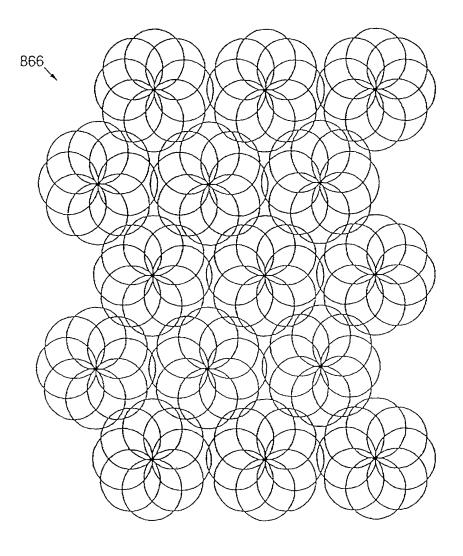
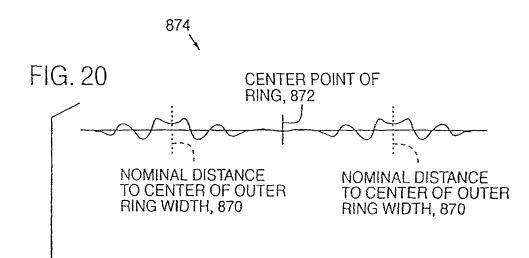


FIG. 19



QUEST FOR MOSAICED KNOT PATTERNS WHICH "COVER" AND ARE COEXTENSIVE WITH ORIGINAL IMAGE; ALL ELEMENTAL KNOT PATTERNS CAN CONVEY THE SAME INFORMATION, SUCH AS A SIGNATURE, OR EACH CAN CONVEY A NEW MESSAGE IN A STEGANOGRAPHIC SENSE



2-D BRIGHTNESS OF PHASE-ONLY FILTERED RING IS SIMILAR TO THE ABOVE BRIGHTNESS PATTERN ROTATED ABOUT CENTRAL POINT OF RING:

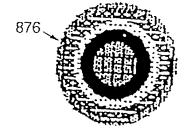


FIG. 21A

900	С	2C	С	
	2C	4C	2C	
	С	2C	С	

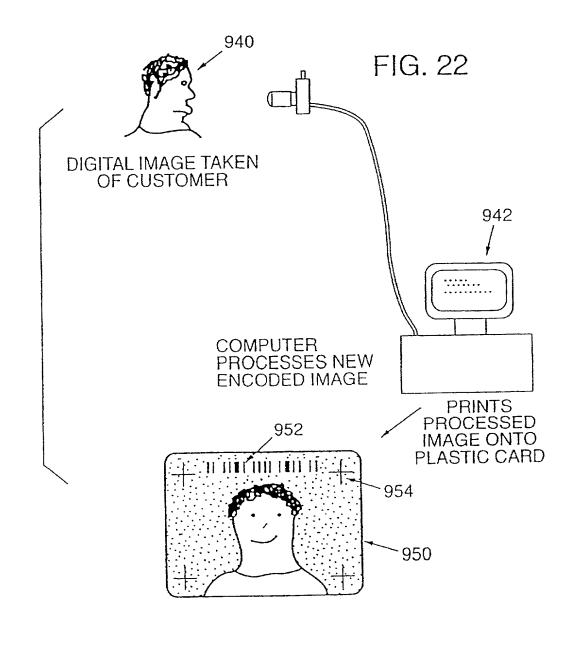
WHERE C = 1/16

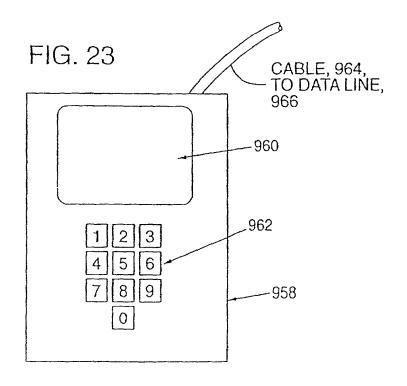
ELEMENTARY BUMP (DEFINED GROUPING OF PIXELS WITH WEIGHT VALUES)

FIG. 21B

III. LID													
								j		j			
	2		3		4		5		6	7		0	
	6		7		0		1		2	3		4	
•••						С	2C	С					
••••	2		3		4	2C	4C	2C	6	7		0	
•••						С	2C	С					<b></b>
***	6		7		0		1		2	3		4	
•••												<u> </u>	<u></u>
•••									:	:	:	:	:

EXAMPLE OF HOW MANY ELEMENTARY BUMPS, 900, WOULD BE ASSIGNED LOCATIONS IN AN IMAGE, AND THOSE LOCATIONS WOULD BE ASSOCIATED WITH A CORRESPONDING BIT PLANE IN THE N-BIT WORD, HERE TAKEN AS N=8 WITH INDEXES OF 0-7. ONE LOCATION, ASSOCIATED WITH BIT PLANE "5", HAS THE OVERLAY OF THE BUMP PROFILE DEPICTED.

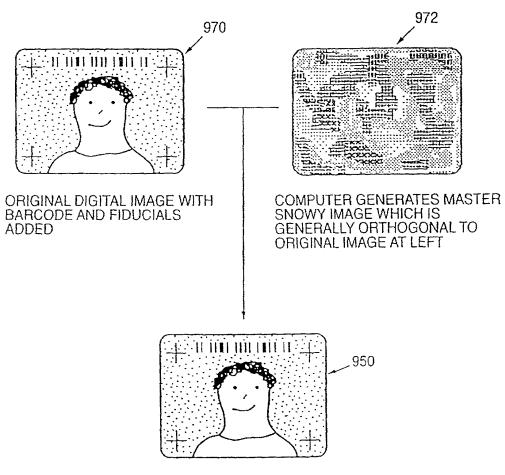




CONTAINS RUDIMENTARY OPTICAL SCANNER, MEMORY BUFFERS, COMMUNICATIONS DEVICES, AND MICROPROCESSOR

CONSUMER MERELY PLACES CARD INTO WINDOW AND CAN, AT THEIR PREARRANGED OPTION, EITHER TYPE IN A PERSONAL IDENTIFICATION NUMBER (PIN, FOR ADDED SECURITY) OR NOT. THE TRANSACTION IS APPROVED OR DISAPPROVED WITHIN SECONDS.

FIG. 24



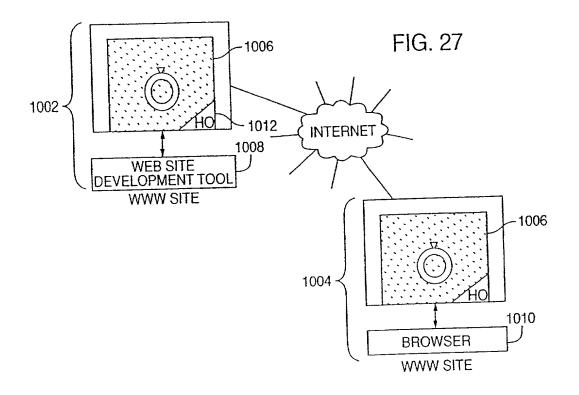
COMBINED TO FORM PERSONAL CASH CARD

# TYPICAL TRANSACTION STEPS FIG. 25

- 1. READER SCANS IMAGE ON CARD, STORES IN MEMORY, EXTRACTS PERSON'S ID
  - 2. OPTIONAL: USER KEYS IN PIN NUMBER
- 3. READER CALLS CENTRAL ACCOUNT DATA NETWORK, HANDSHAKES
  - REQUESTED TRANSACTION AMOUNT TO CENTRAL NETWORK 4. READER SENDS ID, (PIN), MERCHANT INFORMATION, AND
- 5. CENTRAL NETWORK VERIFIES ID, PIN, MERCHANT INFO.
  - AND ACCOUNT BALANCE
- 6. IF OK, CENTRAL NETWORK GENERATES TWENTY-FOUR SETS OF SIXTEEN DISTINCT RANDOM NUMBERS,
  - WHERE THE RANDOM NUMBERS ARE INDEXES
- TO A SET OF 64K ORTHOGONAL SPATIAL PATTERNS
  - 7. CENTRAL NETWORK TRANSMITS FIRST OK, AND THE
    - SETS OF RANDOM NUMBERS
- 8. READER STEPS THROUGH THE TWENTY-FOUR SETS 8A. READER ADDS TOGETHER SET OF ORTHOGONAL
- 8B. READER PERFORMS DOT PRODUCT OF
  - RESULTANT PATTERN AND CARD SCAN,
    - STORES RESULT
- 9. READER TRANSMITS THE TWENTY-FOUR
- DOT PRODUCT RESULTS TO CENTRAL NETWORK
- 10. CENTRAL NETWORK CHECKS RESULTS AGAINST MASTER
  - 12. CENTRAL NETWORK DEBITS MERCHANT ACCOUNT, 11. CENTRAL NETWORK SENDS FINAL APPROVAL OR DENIAL
    - - CREDITS CARD ACCOUNT

FIG. 26
THE NEGLIGIBLE-FRAUD CASH CARD SYSTEM

A BASIC FOUNDATION OF THE CASH CARD SYSTEM IS A 24-HOUR INFORMATION NETWORK, WHERE BOTH THE STATIONS WHICH CREATE THE PHYSICAL CASH CARDS, 950, AND THE POINT-OF-SALES, 984, ARE ALL HOOKED UP TO THE SAME NETWORK CONTINUOUSLY



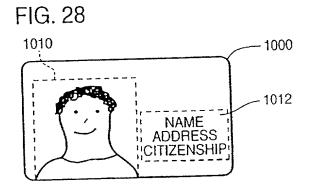
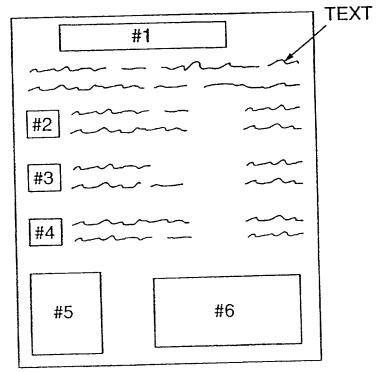


FIG. 27A



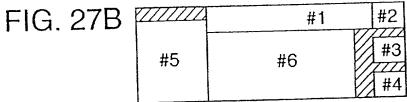
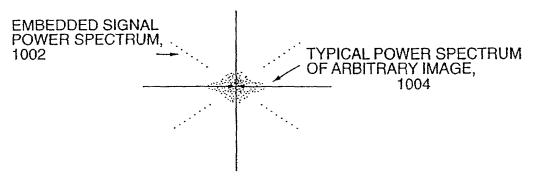


FIG. 29

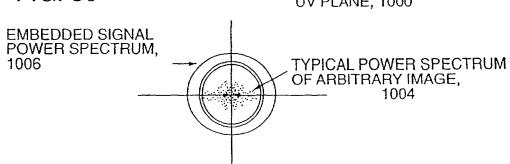
UV PLANE, 1000



NON-HARMONIC SPATIAL FREQUENCIES ALONG THE 45 DEGREE AXES, GIVING RISE TO A WEAVE-LIKE CROSS-HATCHING PATTERN IN THE SPATIAL DOMAIN

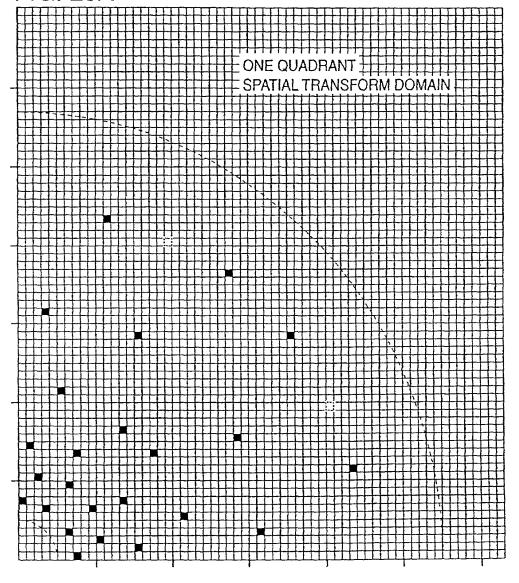


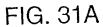
UV PLANE, 1000

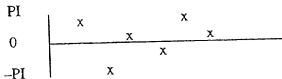


NON-HARMONIC CONCENTRIC CIRCLES IN UV PLANE, WHERE PHASE HOPS QUASI-RANDOMLY ALONG EACH CIRCLE, GIVING RISE TO PSEUDO RANDOM LOOKING PATTERNS IN THE SPATIAL DOMAIN

FIG. 29A

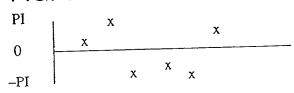






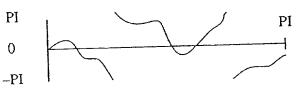
PHASE OF SPATIAL FREQUENCIES ALONG FORWARD 45 DEGREE AXES, 1008

FIG. 31B



PHASE OF SPATIAL FREQUENCIES ALONG BACKWARD 45 DEGREE AXES, 1010

FIG. 32A



PHASE OF SPATIAL FREQUENCIES ALONG FIRST CONCENTRIC RING, 1012

FIG. 32B

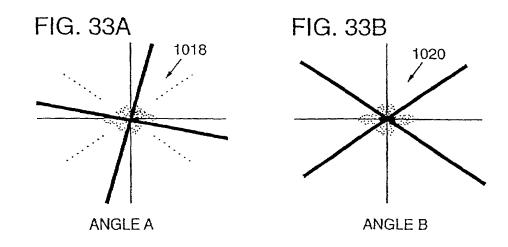


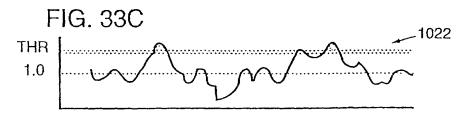
PHASE OF SPATIAL FREQUENCIES ALONG SECOND CONCENTRIC RING, 1014

FIG. 32C

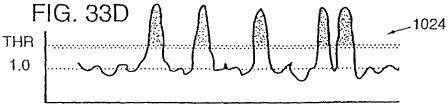


PHASE OF SPATIAL FREQUENCIES ALONG THIRD CONCENTRIC RING, 1016

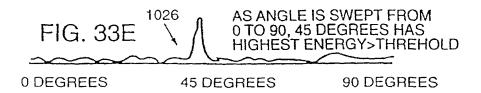


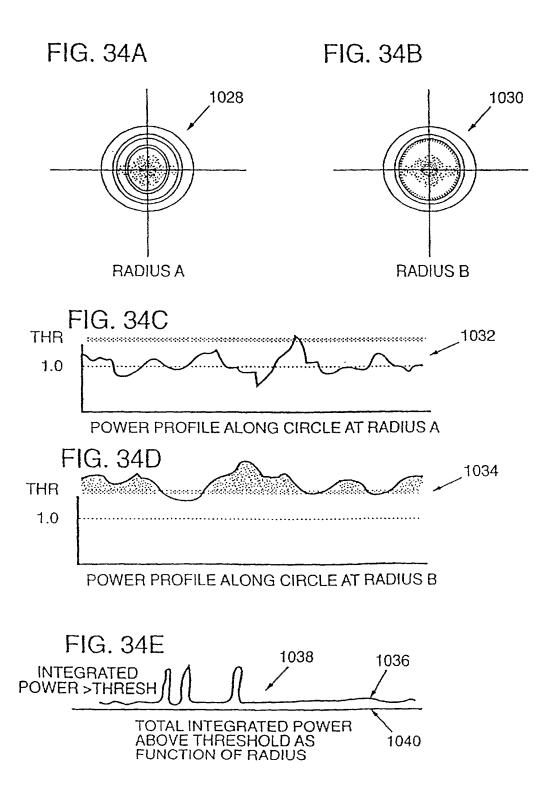


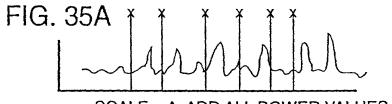
POWER PROFILE ALONG ANGLE A, AS NORMALIZED BY ITS OWN MOVING AVERAGE; ONLY A MINIMAL AMOUNT EXCEEDS THRESHOLD, GIVING A SMALL INTEGRATED VALUE



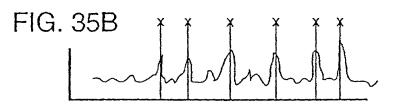
POWER PROFILE ALONG ANGLE B, AS NORMALIZED BY ITS OWN MOVING AVERAGE; THIS FINDS STRONG ENERGY ABOVE THE THRESHOLD



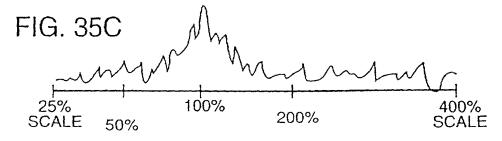




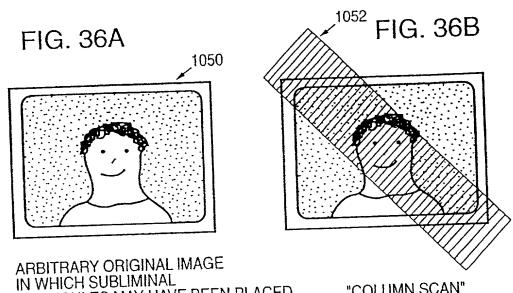
SCALE = A; ADD ALL POWER VALUES AT THE "KNOWN" FREQUENCIES", 1042



SCALE = B; ADD ALL POWER VALUES AT THE "KNOWN" FREQUENCIES", 1044

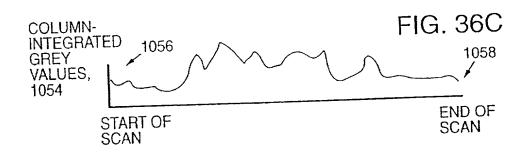


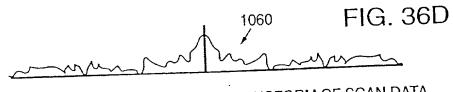
"SCALED-KERNEL" BASED MATCHED FILTER; PEAK IS WHERE THE SCALE OF THE SUBLIMINAL GRID WAS FOUND, 1046



IN WHICH SUBLIMINAL
GRATICULES MAY HAVE BEEN PLACED

"COLUMN SCAN"
IS APPLIED ALONG A
GIVEN ANGLE THROUGH
THE CENTER OF THE
IMAGE



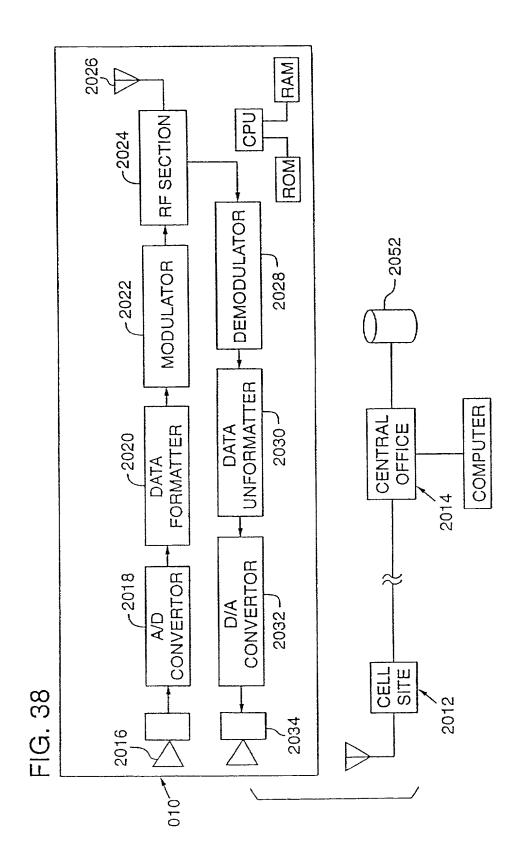


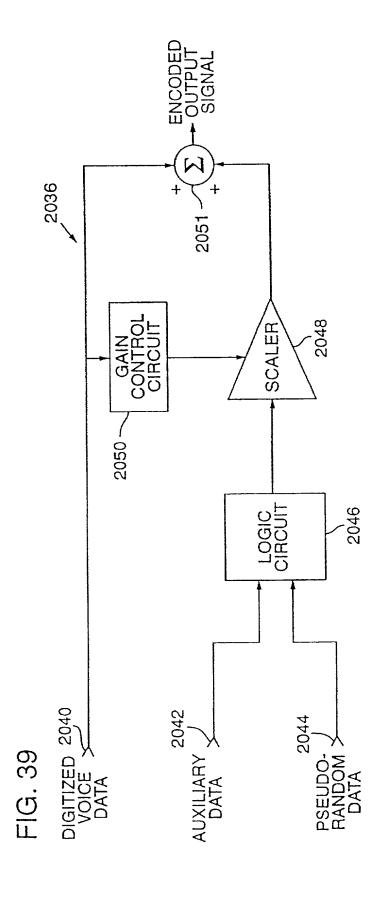
MAGNITUDE OF FOURIER TRANSFORM OF SCAN DATA

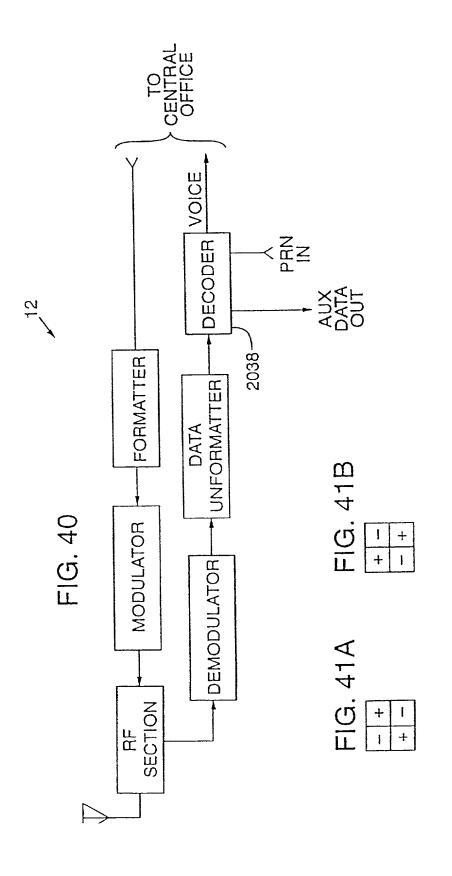
### FIG. 37

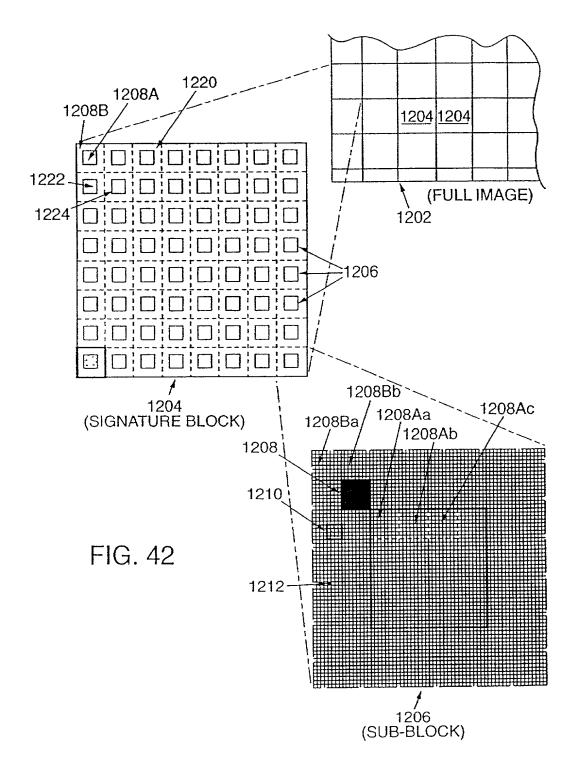
### PROCESS STEPS

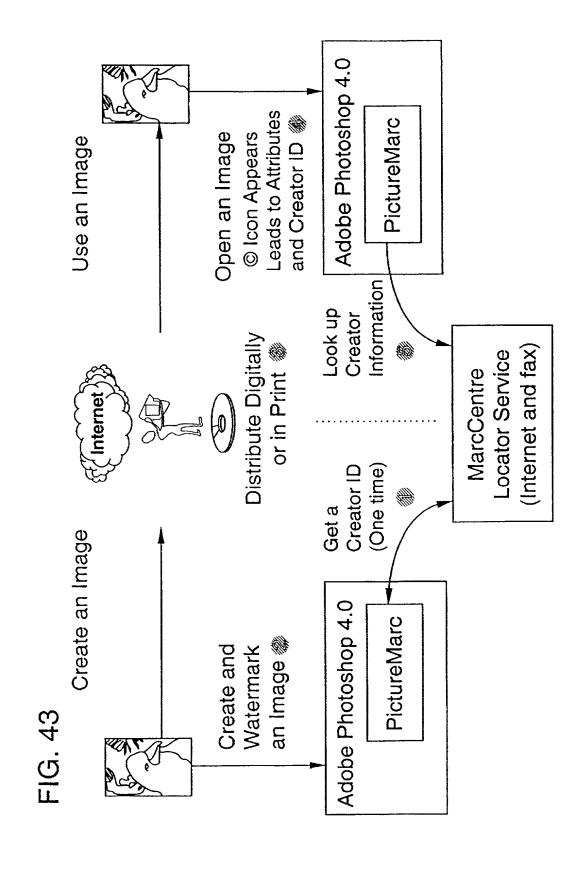
- 1. SCAN IN PHOTOGRAPH
- 2. 2D FFT
- 3. GENERATE 2D POWER SPECTRUM, FILTER WITH E.G. 3X3 BLURRING KERNEL
- 4. STEP ANGLES FROM 0 DEGREES THROUGH 90 (1/2 DEG)
- 5. GENERATE NORMALIZED VECTOR, WITH POWER VALUE AS NUMERATOR, AND MOVING AVERAGED POWER VALUE AS DENOMINATOR
- 6. INTEGRATE VALUES AS SOME THRESHOLD, GIVING A SINGLE INTEGRATED VALUE FOR THIS ANGLE
- 7. END STEP ON ANGLES
- 8. FIND TOP ONE OR TWO OR THREE "PEAKS" FROM THE ANGLES IN LOOP 4, THEN FOR EACH PEAK...
- 9. STEP SCALE FROM 25% TO 400%, STEP ~1.01
- 10. ADD THE NORMALIZED POWER VALUES CORRESPONDING TO THE 'N' SCALED FREQUENCIES OF STANDARD
- 11. KEEP TRACK OF HIGHEST VALUE IN LOOP
- 12. END LOOP 9 AND 8, DETERMINE HIGHEST VALUE
- 13. ROTATION AND SCALE NOW FOUND
- 14. PERFORM TRADITIONAL MATCHED FILTER TO FIND EXACT SPATIAL OFFSET
- 15. PERFORM ANY "FINE TUNING" TO PRECISELY DETERMINE ROTATION, SCALE, OFFSET

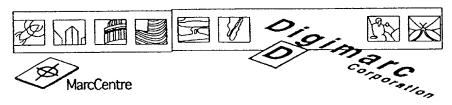












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FIG. 44

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State/Province			FIG. 45
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Country			
Phone Number	un un une interpretation		
Fax Number		2 - 201 - 1122	
Email Address	Control of		
Your Home Page	;	<u> </u>	<del>wi</del>
potential customer find below to tell us what y	nuch of your contact infords Is your profile on MarcCorou want people to see.	entre. Use the selection	
Phone Number	Mailing Address	Email Account	
Show	• Show	Show	
Don't show Yes, I want to be on yo	ODon't show	On't show	
Please select your prof			
rease select your pro-	• Photographer		
	Illustrator		
	Other		
	nte your primary area of fe	•	
-	ct one of the options from		e in
your own in the space Photographer	next to "Custom Specialt	у	
	Illustrator	: :	
(none)	(none)	<u>i</u> i	
Custom Specialty			

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edit your profile inform				
required before you ca	<del>-</del>			
required before you ca	Password Re-enter t			
<i>:</i> *	rassword Re-enter	o verny		
The standard fee for th	e MarcCentre service	is \$150 (US)	). From now until	
December 31st, 1996 y regular price!	you can subscribe for	only \$79 (US	5), over 50% off th	ne
For security reasons, the secured sockets technology		rd informatio	n is captured usin	g
Credit Card	<i>.</i> ,			
• Visa				
MasterCard				
American Express				
Card Number	Name Showi	on Card	Expiration (MM/YY)	
When you are satisfied	tuith your entries on	thic form pre	oce the "Part 1	•
Complete" button and				
sign-up. If you wish to				
sign-up. If you wish to	:		our oromaci.	
	Part 1 Complete	• :		FIG. 46
				FIG. 40

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FIG. 47

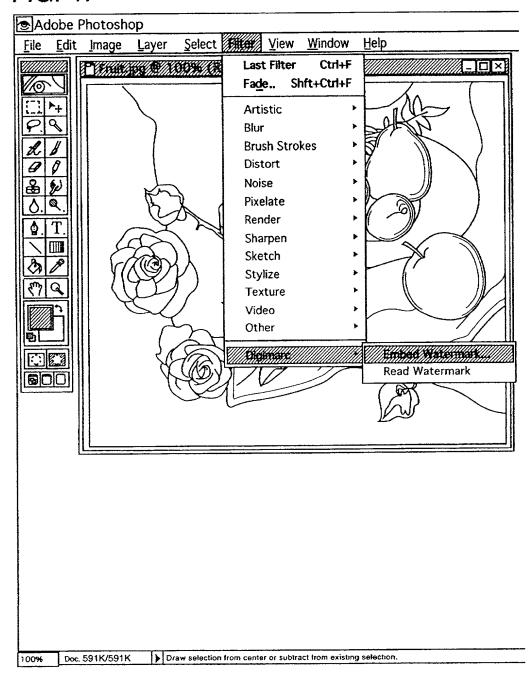


FIG. 48

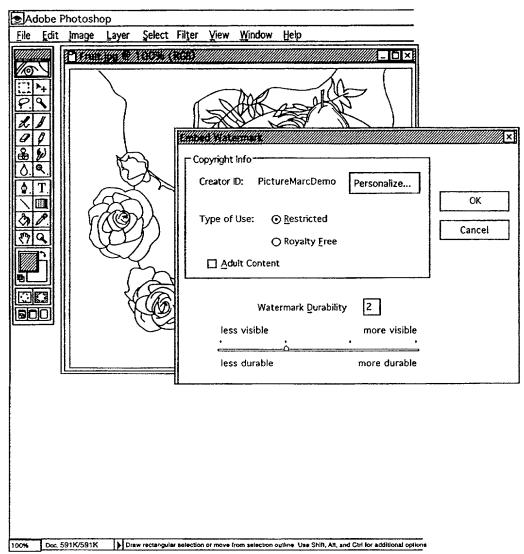


FIG. 49

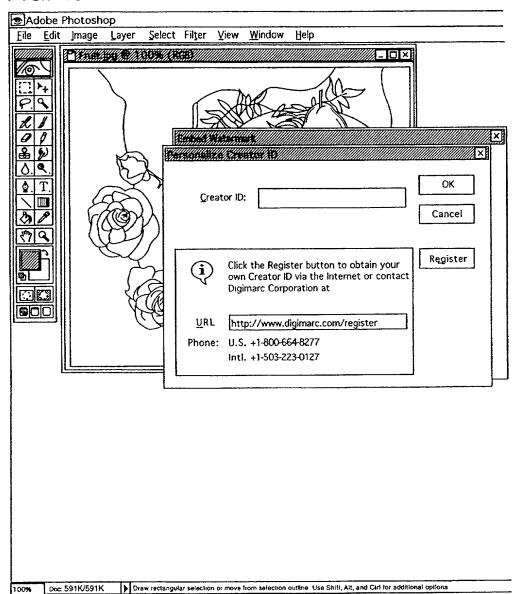


FIG. 50

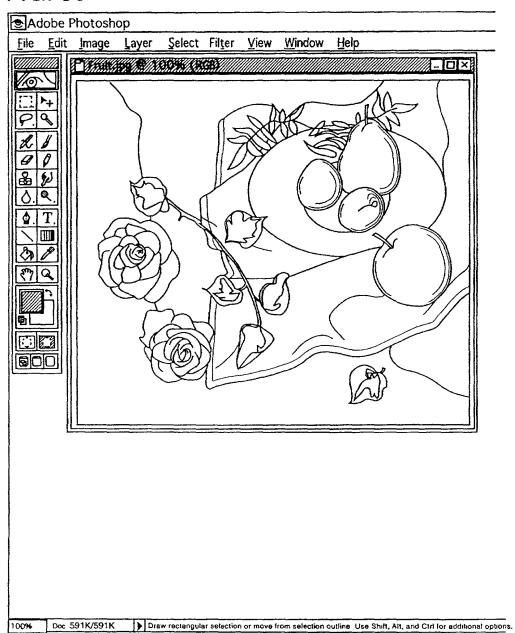


FIG. 51

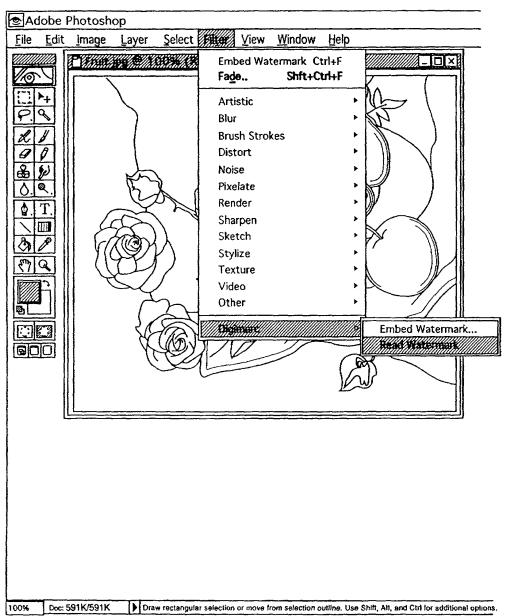
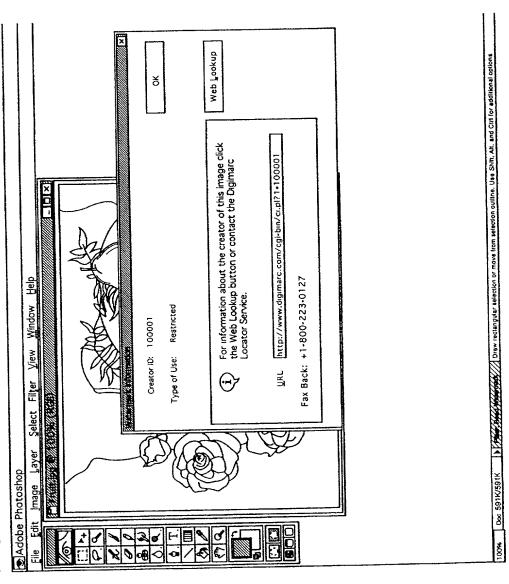


FIG. 52



R C 

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## MarcCentre Image Creator Search

Enter the Image Creator ID in the box below and press "Submit Search". If it is a valid ID, the contact information details will be listed.

Image Creator ID: Submit Search

If you want to search for specific image creators by a variety of criteria such as last name, specialy, city and/or state then press the "General Search" button below.

FIG. 54

General Search

Creator Search	Photoshop 4.0 Offer	Special Offers	Digimarc Free Reader	
Member Services	Subscribe	Feedback	Horne	

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FIG. 55

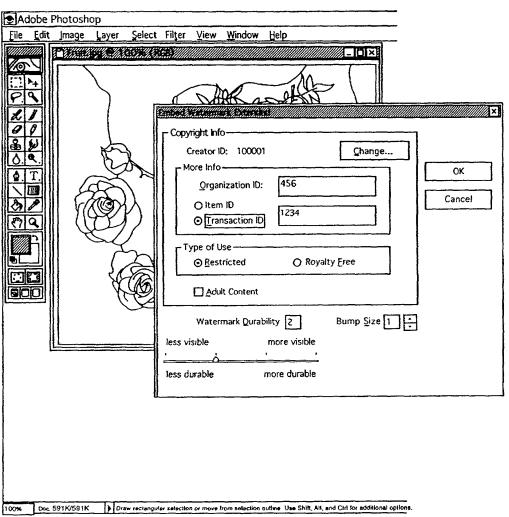


FIG. 56

